REMARKS

Favorable reconsideration and allowance of the claims of the present application are respectfully requested.

Before addressing the specific grounds of rejection raised in the present Office Action, applicants have amended Claims 1, 16, 17, and 18 to positively recite that the claimed process removes *reactive ion etch residue from a surface of a previously reactive ion etched precision surface*. Support for this amendment is found throughout the specification of the instant application. See, for example, Page 2, lines 25-26; Page 3, lines 19-20; and Page 6, line 5 of the specification of the instant application. Since the above amendment to the Claims 1, 16, 17 and 18 does not introduce any new matter into the specification, entry thereof is respectfully requested. Applicants have also made minor amendments to Claims 2, 3, 12, 13 and 15 which are self-explanatory.

Claims 1, 2, 15 and 16 stand rejected under 35 U.S.C. 103(a) as allegedly obvious over U.S. Patent No. 6,331,487 to Koch ("Koch") in view of U.S. Patent No. 6,355,153 to Uzoh, et al. ("Uzoh, et al."). Claims 3-14 stand rejected under 35 U.S.C. 103(a) as allegedly obvious over Koch in view of Uzoh, et al. and further in view of the article to R. Alm entitled "Formulation Techniques using Triflic Acid Salts" ("Alm"). Claims 17 – 20 stand rejected under 35 U.S.C. §103(a) as allegedly obvious over Koch in view of U.S. Patent No. 6,316,057 to Hirayama, et al. ("Hirayama, et al.").

Applicants submit that the claims of the present invention are not rendered unpatentable by the disclosures of Koch in combination with Uzoh, et al., or further in combination with Alm or Hirayama, et al. since none of the applied references teaches or suggests applicants' claimed process for removing reactive ion etch residue from a reactive

ion etched (RIE) precision surface having vias, cavities, trenches, and channels formed therein. "To establish a prima facie case of obviousness of a claimed invention all the claimed limitations must be taught or suggested by the prior art". In re Wilson, 424 F.2d 1382, 1385, 165 USPQ 44, 496 (CCPA 1970).

Applicants respectfully submit that the claims of the present application are not obvious from the disclosure of Koch since the applied reference does not teach or suggest applicants' claimed process which removes *reactive ion etch residue from a reactive ion etched precision surface that contains vias, cavities, trenches or channels incorporated therein.* Instead, Koch provides a process for removing chemical mechanical polishing (CMP) residue from a previously polished surface layer. The CMP residue disclosed in Koch contains CMP chemicals (such as a silica-based or metallic based slurry material) and particles (from the polished surface) that are formed following the CMP process.

In the claimed process, reactive ion etch residue is removed from a reactive ion etched precision surface. The reactive ion etch residue that is removed by the present process is composed of etchant gas material, the material being etched as well as the polymeric photoresist material, which is used in forming the vias, cavities, trenches or channels. Applicants, referring to Page 6, lines 5-8, further define the reactive ion etch residue formed on the "RIE precision surfaces, [to be] a polymeric type deposit which resembles polyflouroethylene." Specifically, applicants disclose that the reactive ion etch residue contains one or more of the following elements: carbon, hydrogen, silicon, aluminum, titanium, tungsten, platinum, palladium, iridium, chromium, fluorine, chlorine, and oxygen. Applicants respectfully submit that the reactive ion etched residue removed by the claimed

process is different from the CMP residue that is removed in the process disclosed in Koch, or any of the applied references.

Applicants further submit that in the present claimed process the reactive ion etch residue is removed from a reactive ion etched precision surface that contains vias, cavities, trenches and channels therein. In contrast thereto, the CMP residue is removed from a surface, which has been planarized by a CMP process. As is well known to those skilled in the art, the CMP process is not used in forming precision surfaces that have vias, cavities, trenches, and channels. Instead, the CMP process provides a planarized surface.

Uzoh, et al. do not alleviate the above deficiencies in Koch since the applied secondary reference also does not teach or suggest a process for removing *reactive ion etch residue from a reactive ion etched precision surface that contains vias, cavities, trenches or channels incorporated therein*. Instead, Uzoh, et al. disclose selectively removing portions of a seed layer **6** from a top surface of a substrate **2** and then depositing a conductive material **8** in the cavities of the substrate, where portions of the seed layer **8** remains in the cavities. Uzoh, et al. further disclose, referring to column 5, lines 50-53, where, "a porous pad type material **20** with or without fixed abrasive particles is used to selectively polish the seed layer **6** from the top surface of the substrate." Therefore, Uzoh, et al. discloses an abrasive contact used to planarized or polish a surface, similar to Koch, and is far removed from applicants' process for removing *reactive ion etch residue from a reactive ion etched precision surface that contains vias, cavities, trenches or channels incorporated therein.*

Applicants note that although Uzoh, et al. make reference to reactive ion etching, Uzoh, et al. do not teach or suggest cleaning a reactive ion etched precision surface that contains vias, cavities, trenches, or channels incorporated therein, as recited in amended

Claim 1. Uzoh, et al., referring to column 7, lines 19-24, disclose where, "after depositing the conductive material in the cavities the barrier layer can be removed, by conventional polishing or reactive ion etch (RIE), after selectively removing the barrier layer and planarizing/polishing the top surface of the substrate." Referring to Column 8, lines 9-13, Uzoh, et al. further disclose where, "after depositing the second conductive material 26 on the first conductive material 24, the second conductive material 26 can be planarized using CMP or RIE to form the structure as illustrated in FIG. 3Biid." Applicants note that the RIE process steps disclosed in Uzoh, et al. are conducted after material has been deposited into the cavities of the substrate in a permanent manner. Since material remains within the cavities of the substrate any later processing steps whether they include CMP or RIE cannot remove residue that is already within the cavities of the device. The above noted RIE process steps are employed in a planarizing manner, similar to CMP, and are not utilized in a manner, which allows for reactive ion residue to be removed from the cavities and vias of the precision surface of the substrate. Therefore, Uzoh, et al. do not teach or suggest the applicants' process for removing *reactive ion etch residue from a reactive ion etched precision surface that contains vias, cavities, trenches or channels incorporated therein*, as recited in amended Claim1.

In addition, Uzoh, et al. teach away from the current invention, which removes reactive ion etch residue from the vias, trenches, and cavities of the reactive ion etched precision surface. A prior art reference must be considered in its entirety, i.e., as a whole, including portions that would lead away from the claimed invention. W.L. Gore and Associates, Inc. v. Garlock, Inc., 721 F.2d 1540, 220 USPQ 303 (Fed. Cir. 1983). Uzoh, et al., referring to Column 6, lines 14-19, disclose that, "the purpose of applying the electrical potential between the anode 22 and the conducting substrate and generating an electric current

is to avoid the dissolution of the seed layer 6 in the cavities during the process of polishing the top surface of the surface of the substrate." Therefore, since Uzoh et al. disclose a means for protecting material within the vias, cavities, or trenches of a substrate surface, Uzoh et al. teach away from applicants' method of cleaning a reactive ion etched precision surface having vias, cavities, trenches, or channels incorporated therein, as recited in amended Claim 1.

Applicants further note that Uzoh, et al. fail to teach or suggest a composition, which comprises liquid or supercritical carbon dioxide and a fluoride-generating species for removing reactive ion etch residue from a precision surface.

Alm also does not alleviate the above deficiencies in Koch or Uzoh, et al. since Alm also does not teach or suggest a process for removing *reactive ion etch residue from a reactive ion etched precision surface that contains vias, cavities, trenches or channels incorporated therein.* Instead, Alm discloses the use of acid catalysts based on trifluoromethanesulfonic (triflic) acid that, when heated, catalyze the polymerization of cationically sensitive thermoset resin coatings. Applicants respectfully submit that the disclosure of Alm does not teach or suggest that triflic acid or one of its salts can be used in conjunction with liquid or supercritical fluid carbon dioxide to remove *reactive ion etch residue from a reactive ion etched precision surface that contains vias, cavities, trenches or channels incorporated therein.*

Hirayama, et al. do not alleviate the deficiencies in Koch, Uzoh, et al. or Alm since the applied secondary reference also does not teach or suggest a process for removing *reactive ion etch residue from a precision surface that contains vias, cavities, trenches or channels incorporated therein.* Instead, Hirayama, et al. disclose a process for coating a surface of a semiconductor device which comprises the steps of applying a reagent comprising a reactive group selected from Si-H, Sn-H and Ge-H, in the presence of a platinum metal onto a surface

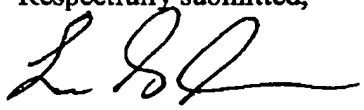
that is to be coated. Applicants respectfully submit that the disclosure of Hirayama, et al. does not teach or suggest that the reagent disclosed therein can be used in conjunction with liquid or supercritical fluid carbon dioxide to remove *reactive ion etch residue from a reactive ion etched precision surface that contains vias, cavities, trenches or channels incorporated therein.*

The various §103 rejections also fail because there is no motivation in the applied references, which suggest modifying the disclosed processes such that the same can be used for removing *reactive ion etch residue from a reactive ion etched precision surface that contains vias, cavities, trenches or channels incorporated therein.* Thus, there is no motivation provided in the applied references, or otherwise of record, to make the modification mentioned above. "The mere fact that the prior art may be modified in the manner suggested by the Examiner does not make the modification obvious unless the prior art suggested the desirability of the modification." In re Vaeck, 947 F.2d, 488, 493, 20 USPQ 2d. 1438, 1442 (Fed.Cir. 1991).

The rejections under 35 U.S.C. §103 have been obviated; therefore reconsideration and withdrawal thereof is respectfully requested.

Thus, in view of the foregoing amendments and remarks, it is firmly believed that the present case is in condition for allowance, which action is earnestly solicited.

Respectfully submitted,



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